

IN THE CLAIMS:

Claim 1. **(Currently Amended)** A control circuit of a DC-DC converter that generates either one of a step-down control signal and a step-up control signal, the control circuit comprising:

 a switch circuit for outputting the step-down control signal in response to a first switching signal and outputting the step-up control signal in response to a second switching signal; and

 a switching signal generation circuit which is internal to the control circuit and connected to the switch circuit for selectively generating the first and second switching signals using a duty setting signal, which controls either one of the step-down control signal and the step-up control signal, wherein the switching signal generation circuit includes a comparator for comparing the duty setting signal with a reference voltage including the maximum voltage of a triangular wave signal, and wherein, based on a comparison result, the comparator generates the first switching signal when the duty setting signal represents a step-down operation and generates the second switching signal when the duty setting signal represents a step-up operation.

Claim 2. **(Previously Presented)** The control circuit according to claim 1, wherein the reference voltage includes a median voltage between the maximum voltage of the triangular wave signal and a voltage corresponding to a predetermined percent of the maximum voltage, and wherein the comparator compares the voltage of the duty setting signal with the median voltage.

Claim 3. (Cancelled)

Claim 4. (Original) The control circuit according to claim 1, further comprising:
a duty setting signal generation circuit for generating the duty setting signal in
accordance with a digital setting signal.

Claim 5. (Original) The control circuit according to claim 4, wherein the duty
setting signal generation circuit includes:

 a decoder circuit for decoding the digital setting signal to generate a decoded
 signal; and
 an analog voltage generation circuit connected to the decoder circuit for
 generating the duty setting signal in accordance with the decoded signal.

Claim 6. (Original) The control circuit according to claim 4, wherein the duty
setting signal generation circuit includes:

 a comparator for comparing an input voltage and an output voltage of the DC-DC
 converter to generate a comparison signal; and
 an analog voltage generation circuit connected to the comparator for generating
 the duty setting signal in accordance with the comparison signal.

Claim 7. (Currently Amended) A control circuit of a DC-DC converter
comprising:

a first PWM comparator for comparing an input signal, a duty setting signal, and a triangular wave signal to generate either one of a first step-down control signal and a first step-up control signal;

a second PWM comparator for comparing the input signal and the triangular wave signal to generate either one of a second step-down control signal and a second step-up control signal;

a switch circuit connected to the first and second PWM comparators for outputting the first and second step-down control signals in response to a first switching signal and outputting the first and second step-up control signals in response to a second switching signal; and

a switching signal generation circuit which is internal to the control circuit and connected to the switch circuit for selectively generating the first and second switching signals using the duty setting signal, wherein the switching signal generation circuit includes a comparator for comparing the duty setting signal with a reference voltage including the maximum voltage of the triangular wave signal, and wherein, based on a comparison result, the comparator generates the first switching signal when the duty setting signal represents a step-down operation and generates the second switching signal when the duty setting signal represents a step-up operation.

Claim 8. (Previously Presented) The control circuit according to claim 7, wherein the reference voltage includes a median voltage between the maximum voltage of the triangular wave signal and a voltage corresponding to a predetermined percent of

the maximum voltage, and wherein the comparator compares the voltage of the duty setting signal with the median voltage.

Claim 9. (Cancelled)

Claim 10. (Original) The control circuit according to claim 7, further comprising:
a duty setting signal generation circuit for generating the duty setting signal in accordance with a digital setting signal.

Claim 11. (Original) The control circuit according to claim 10, wherein the duty setting signal generation circuit includes:

a decoder circuit for decoding the digital setting signal to generate a decoded signal; and

an analog voltage generation circuit connected to the decoder circuit for generating the duty setting signal in accordance with the decoded signal.

Claim 12. (Original) The control circuit according to claim 10, wherein the duty setting signal generation circuit includes:

a comparator for comparing an input voltage and an output voltage of the DC-DC converter to generate a comparison signal; and

an analog voltage generation circuit connected to the comparator for generating the duty setting signal in accordance with the comparison signal.

Claim 13. (Currently Amended) A DC-DC converter including a step-down circuit for decreasing an input voltage to generate a step-down output voltage or a step-up circuit for increasing the input voltage to generate a step-up output voltage, the DC-DC converter comprising:

a control circuit connected to the step-down circuit or the step-up circuit for generating either one of a step-down control signal, which controls the step-down circuit, or a step-up control signal, which controls the step-up circuit, wherein the control circuit includes;

a switch circuit for outputting the step-down control signal in response to a first switching signal and outputting the step-up control signal in response to a second switching signal; and

a switching signal generation circuit which is internal to the control circuit and connected to the switch circuit for selectively generating the first and second switching signals using a duty setting signal, which controls the duty of either one of the step-down control signal and the step-up control signal, wherein the switching signal generation circuit includes a comparator for comparing the duty setting signal with a reference voltage including the maximum voltage of a triangular wave signal, and wherein, based on a comparison result, the comparator generates the first switching signal when the duty setting signal represents a step-down operation and generates the second switching signal when the duty setting signal represents a step-up operation.

Claim 14. (Previously Presented) The DC-DC converter according to claim 13, wherein the reference voltage includes a median voltage between the maximum voltage of the triangular wave signal and a voltage corresponding to a predetermined percent of the maximum voltage, and wherein the switching signal generation circuit compares the voltage of the duty setting signal with the median voltage.

Claim 15. (Cancelled)

Claim 16. (Original) The DC-DC converter according to claim 13, wherein the control circuit further includes:

a duty setting signal generation circuit for generating the duty setting signal in accordance with a digital setting signal.

Claim 17. (Original) The DC-DC converter according to claim 16, wherein the duty setting signal generation circuit includes:

a decoder circuit for decoding the digital setting signal to generate a decoded signal; and

an analog voltage generation circuit connected to the decoder circuit for generating the duty setting signal in accordance with the decoded signal.

Claim 18. (Original) The DC-DC converter according to claim 16, wherein the duty setting signal generation circuit includes:

a comparator for comparing an input voltage and an output voltage of the DC-DC converter to generate a comparison signal; and
an analog voltage generation circuit connected to the comparator for generating the duty setting signal in accordance with the comparison signal.

Claim 19. (Currently Amended) A method for controlling a DC-DC converter including a step-down circuit or a step-up circuit, the method comprising the steps of:
generating either one of a step-down control signal, which controls the step-down circuit, or a step-up control signal, which controls the step-up circuit;
comparing a duty setting signal with a reference voltage including the maximum voltage of a triangular wave signal, wherein the duty setting signal controls the duty of either one of the step-down control signal and the step-up control signal;
internally generating a first switching signal for selecting the step-down control signal when the duty setting signal represents a step-down operation based on a comparison result;
internally generating a second switching signal for selecting the step-up control signal when the duty setting signal represents a step-up operation based on the comparison result;
providing the step-down control signal to the step-down circuit in response to the first switching signal; and
providing the step-up control signal to the step-up circuit in response to the second switching signal.